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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/732,771	12/09/2003	John R. Bennett	117846.02	6950

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EXAMINER

PHAM, HUNG Q

ART UNIT	PAPER NUMBER
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2168

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	02/26/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 02/26/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/732,771	BENNETT ET AL.	
	Examiner	Art Unit	
	HUNG Q. PHAM	2168	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 19-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 19-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/18/2007 has been entered.

Response to Arguments

- *Specification*

The Specification has been amended with a new title. The new title is acknowledged.

- *Claim Objections*

The objection of claim 2 has been withdrawn in view of the cancellation of the objected claim.

- *Claim Rejections - 35 USC § 101*

The rejection of claims 1-11 under 35 U.S.C. § 101 has been withdrawn in view of the amendment of claim 1 and the cancellation of claims 2-11.

- *Claim Rejections - 35 USC § 112*

The rejections of claims 1 and 3 under 35 U.S.C. § 112, first and second paragraph, have been withdrawn in view of the amendment.

- Claim Rejections - 35 USC § 102

Applicants' arguments with respect to the *tag bit* and *tag mask bits* as recited in claim 1 and "SKIP field" as disclosed by Knuth have been considered but are moot in view of the amendment of claim 1. However, the examiner respectfully points out that the recited *tag bit*, *tag mask bits* and their amended features are anticipated by Knuth.

As shown in FIG. 33 of Page 498 is a Patricia tree comprises a plurality of nodes. Each node contains several fields, e.g., KEY, LLINK, RLINK, LTAG, RTAG, SKIP... (Page 499 Lines 7-8). As taught by Knuth, LTAG or RTAG is one-bit field that tells whether or not LLINK or RLINK, respectively, is pointed to children or to ancestors of the node. The dotted lines in FIG. 33 correspond to pointers whose TAG bit is 1 (Page 499 Lines 16-18). To search for a particular string, LTAG and RTAG are identified to traverse the trie (Page 499 Lines 33-34). Thus, to traverse to the next left or right node from a node (Page 499 Lines 16-18), *a tag bit of LTAG and RTAG is identified, where in the setting of the tag bit indicates a presence of a tag corresponding to the node*, e.g., RTAG = 1 and 1 is the setting of the tag bit indicates the presence of RTAG tag corresponding to that node.

As discussed above, LTAG or RTAG is one-bit field that tells whether or not LLINK or RLINK, respectively, is pointed to children or to ancestors of the node (Page 499 Lines 16-17), wherein LLINK and RLINK are pointers, and these fields must be at least lg N bits long (Page 499 Lines 14-15). Thus, via LTAG or RTAG, LLINK or RLINK as *a tag mask field within the node based on a setting of the tag bit*, e.g., 1, respectively, is identified. LLINK or RLINK or *tag mask field having a plurality of tag mask bits*, e.g., lg N bits long. Assuming lg N bits long is 8, the setting of 8 bits indicates a plurality of tags, e.g., 1 or 0, and the setting corresponds to the node because the node contains

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several fields such as KEY, LLINK, RLINK, LTAG, RTAG, SKIP (Page 499 Lines 7-8. In short, the lg N bits as *tag mask bits indicate a plurality of tags corresponding to the node.*

In light of the foregoing arguments, the 35 U.S.C. § 102 is hereby sustained.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 21, 28, 31, 32 and 34-36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As in claim 1, the claimed limitation, *outputting the data component*, was not described in the Specification. For the purpose of examination, this claimed limitation will be interpreted in light of the description at Page 13 Lines 23-25, wherein the trie is searched and return a TRUE value if the word is present in the trie and a FALSE value if not present.

As in claim 21, the claimed limitation, *the header including at least one bit for indicating a size of the tag mask field*, was not described in the Specification.

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As in claim 28, the claimed limitation, *outputting a word in the trie based on the pattern of values of the tag mask bits of the tag mask field*, was not described in the Specification.

As in claim 31, the claimed limitation, *a value size array field for indicating a size of the value associated with the at least one tag mask bit*, was not described in the Specification.

As in claim 32, the claimed limitation, *identifying a tag mask bit as having associated tag data based on a value of the tag value field; determining the tag data associated with the identified tag mask bit based on a value of the value mask field, wherein outputting the corresponding data component includes outputting the associated tag data*, was not described in the Specification.

As in claim 34, the claimed limitation, *determining a number of tags present in the trie based on the tag mask field*, was not described in the Specification.

As in claim 35, the claimed limitation, *determining the number of tags present in the trie includes summing the number of one bits in the tag mask field of the node*, was not described in the Specification.

As in claim 36, the claimed limitation, *counting each node in the plurality of nodes that are tagged; generating a map between a unique number and a tagged node based on the array*, was not described in the Specification.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 26-28 and 32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As in claims 26-28 and 32, the clause *the corresponding data component* references to other items in the claims. It is unclear what item is being referenced.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 19, 20, 22-30 and 33-35 are rejected under 35 U.S.C. 102(a) as being anticipated by Knuth [The Art of Computer Programming].

Regarding claim 1, Knuth teaches *a computer-implemented method for identifying a data component in a trie based on multiple tags, the trie including a node section containing a plurality of nodes* (Page 499 Lines 27-36), the method comprising:

identifying a tag bit in a node of the plurality of nodes, wherein a setting of the tag bit indicates a presence of a tag corresponding to the node (As shown in FIG. 33 of Page 498 is a Patricia tree comprises a plurality of nodes. Each node contains several fields, e.g., KEY, LLINK, RLINK, LTAG, RTAG, SKIP... (Page 499 Lines 7-8). As taught by Knuth, LTAG or RTAG is one-bit field that tells whether or not LLINK or RLINK, respectively, is pointed to children or to ancestors of the node. The dotted lines in FIG. 33 correspond to pointers whose TAG bit is 1 (Page 499 Lines 16-18). To search for a particular string, LTAG and RTAG are identified to traverse the trie (Page 499 Lines 33-34). Thus, to traverse to the next left or right node from a node (Page 499 Lines 16-18), *a tag bit of LTAG and RTAG is identified, where in the setting of the tag bit indicates a presence of a tag corresponding to the node*, e.g., RTAG = 1 and 1 is the setting of the tag bit indicates the presence of RTAG tag corresponding to that node);

identifying a tag mask field within the node based on a setting of the tag bit, the tag mask field having a plurality of tag mask bits, wherein settings of the tag mask bits indicate a plurality of tags corresponding to the node (As discussed above, LTAG or RTAG is one-bit field that tells whether or not LLINK or RLINK, respectively, is pointed to children or to ancestors of the node (Page 499 Lines 16-17), wherein LLINK and RLINK are pointers, and these fields must be at least lg N bits long (Page 499 Lines 14-15). Thus, via LTAG or RTAG, LLINK or RLINK as *a tag mask field within the node based on a setting of the tag bit*, e.g., 1, respectively, is identified. LLINK or RLINK or *tag mask field having a plurality of tag mask bits*, e.g., lg N bits long. Assuming lg N bits long is 8, the setting of 8 bits indicates a plurality of tags, e.g., 1 or 0, and the setting corresponds to the node because the node contains several fields such as KEY, LLINK, RLINK, LTAG, RTAG, SKIP (Page 499 Lines 7-8. In short, the lg N bits as *tag mask bits indicate a plurality of tags corresponding to the node*);

determining a data component in the trie based on the plurality of tags (Page 499 Lines 32-36);

outputting the data component (As disclosed at Page 500 Lines 18-22, a TRUE value is returned if the word is present in the trie. This implied the key as *the data component* is outputted).

Regarding claim 19, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 1, Knuth further discloses *the tag bit has a setting for indicating the presence of the tag mask field* (LTAG or RTAG is one-bit field that tells whether or not LLINK or RLINK, respectively, is pointed to children or to ancestors of the node. The dotted lines in FIG. 33 correspond to pointers whose TAG bit is 1 (Page 499 Lines 16-18)).

Regarding claim 20, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 19, Knuth further discloses the step of *determining the absence of tag mask field based on a value of the tag bit* (Page 500 Line 17, RTAG = 0, the method goes to P3).

Regarding claim 22, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 1, Knuth further discloses *the trie further includes a header, the header comprising a tag information field for interpreting the tag bit* (Page 499 Lines 6-8 and 26, LTAG field).

Regarding claim 23, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 22, Knuth further discloses *the tag information field has a setting that indicates multiple tagging is present* (Page 499 Lines 16-18).

Regarding claim 24, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 23, Knuth further discloses the step of *identifying presence of the tag mask field based on the setting of the tag information field and the setting of the tag bit* (Page 499 Lines 16-18).

Regarding claim 25, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 24, Knuth further discloses *at least one tag mask bit of the tag mask field is set to one* (Page 499 Lines 14-15, at least one of lg N bits is one).

Regarding claim 26, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 24, Knuth further discloses *the corresponding data component is based on a pattern of values of the tag mask bits of the tag mask field* (Page 499 Lines 32-34).

Regarding claim 27, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 24, Knuth further discloses *the corresponding data component includes a word in the trie* (Page 499 Lines 32-34).

Regarding claim 28, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 24, Knuth further discloses the step of *outputting a word in the trie based on the pattern of values of the tag mask bits of the tag mask field* (Page 499 Lines 14-15 and 32-34).

Regarding claim 29, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 1, Knuth further discloses *the trie further includes a header, the header including a tag value field for indicating that at least one tag mask bit has at least one associated value* (Page 499 Lines 6-8, 26 and 16-18, LTAG field).

Regarding claim 30, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 29, Knuth further discloses *the header further includes a value mask field for indicating which of the at least one tag mask bits has an associated value* (Page 499 Lines 14-15 and 26).

Regarding claim 33, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 1, Knuth further discloses *the trie further includes a header containing a tag information field* (Page 499 Line 26), and the step of *determining a presence of the tag mask field based on a value of the tag information field and a value of the tag bit* (Page 499 Lines 32-36).

Regarding claim 34, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 33, Knuth further discloses the step of *determining a number of tags present in the trie based on the tag mask field* (Page 500 Lines 7-9).

Regarding claim 35, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 34, Knuth further discloses the step of *summing the number of one bits in the tag mask field of the node* (Page 500 Lines 11-13).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 21, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knuth [The Art of Computer Programming].

Regarding claim 21, Knuth teaches all the claim subject matters as discussed above with respect to claim 1, Knuth further discloses *the trie further includes a header* (Page 499 Lines 6-8 and 26) and *a size of the tag mask field* (Page 499 Lines 14-15), but does not explicitly teach *at least one bit* is included in the header for indicating the size of the tag mask field. However, as suggested by Knuth, the header includes LLINK, and the size of LLINK is lg N bits. Thus, the last bit of lg N bits of LLINK could be used to indicate the size. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to use a bit in LLINK for indicating the size in order to store the information of LLINK.

Regarding claim 31, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 30, but does not explicitly teach *a value size array field for indicating a size of the value associated with the at least one tag mask bit*. However, as suggested by Knuth, the header includes LLINK, and the size of LLINK is $\lg N$ bits. Thus, the last bit of $\lg N$ bits of LLINK could be used to indicate the size of the value. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to use a bit in LLINK for indicating the size in order to store the information of LLINK.

Regarding claim 32, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 30, Knuth further discloses *the node further includes a value field having tag data associated with at least one tag mask bit* (Page 499 Lines 9-13), the method further including: *identifying a tag mask bit as having associated tag data based on a value of the tag value field* (Page 499 Lines 32-34); and *determining the tag data associated with the identified tag mask bit based on a value of the value mask field* (Page 499 Lines 32-34). The missing of Knuth is the step of *outputting the associated tag data* when outputting the corresponding data component. However, the number 24 (as disclosed at Page 499 Lines 9-13), obviously, could be retrieved by searching the node. It would have been obvious for one of ordinary skill in the art at the time the invention was made to include the step of outputting the associated tag data in order to review the pointer.

Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knuth [The Art of Computer Programming] in view of the Admission [BACKGROUND OF THE INVENTION, pages 1-4].

Regarding claim 36, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 33, but does not explicitly teach the step of *identifying additional information to add to the node by partial enumeration, the partial enumeration including: counting each node in the plurality of nodes that are tagged; generating an array of partial enumeration counts; generating a map between a unique number and a tagged node based on the array*. As in the Background is the step of *identifying additional information to add to the node by partial enumeration, the partial enumeration including: counting each node in the plurality of nodes that are tagged; generating an array of partial enumeration counts; generating a map between a unique number and a tagged node based on the array* (Background, Page 3 Line 13-Page 4 Line 12).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to include an enumeration number to a node in order to find a synonym for a word.

Regarding claim 37, Knuth teaches all of the claimed subject matter as discussed above with respect to claim 1, Knuth further discloses the step of *determining a value of the tag bit indicating the presence of the tag mask field* (Knuth, Page 499 Lines 16-18), and *determining a value for each of the tag mask bits of the tag mask field* (Knuth, Page 499 Lines 14-15).

The missing of Knuth is the claimed limitation *a value indicating a corresponding tag associated with the node* is included in the tag mask field, and the step of *identifying a characteristic of a word in the trie based on the value* of the at least one of the tag mask bits.

As in the Background, *a value indicating a corresponding tag associated with the node* and the step of *identifying a characteristic of a word in the trie based on the value* is taught to indicate a valid word (Background, Page 2 Lines 7-20).


It would have been obvious for one of ordinary skill in the art at the time the invention was made to include in LLINK or RLINK a field for indicating a valid word and identifying the valid word based on the value in order to distinguish a valid word with an invalid word.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG Q. PHAM whose telephone number is 571-272-4040. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, TIM T. VO can be reached on 571-272-3642. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


HUNG Q PHAM
Examiner
Art Unit 2168

February 16, 2007